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(54) A car assembly for an elevator

(57) A car assembly for an elevator comprises a car 1, a platform 4, a pair of vertical support frames 5 along the opposite side walls of the car, and an upper beam 6 fixedly secured at both ends to the upper end portions of the vertical support frames; the upper ends of the vertical support frames 5 being positioned higher than the upper surface of said upper beam 6. A buffer 8 is mounted above the beam in a stirrup or bracket 9. The car roof is recessed to accommodate the beam 6.

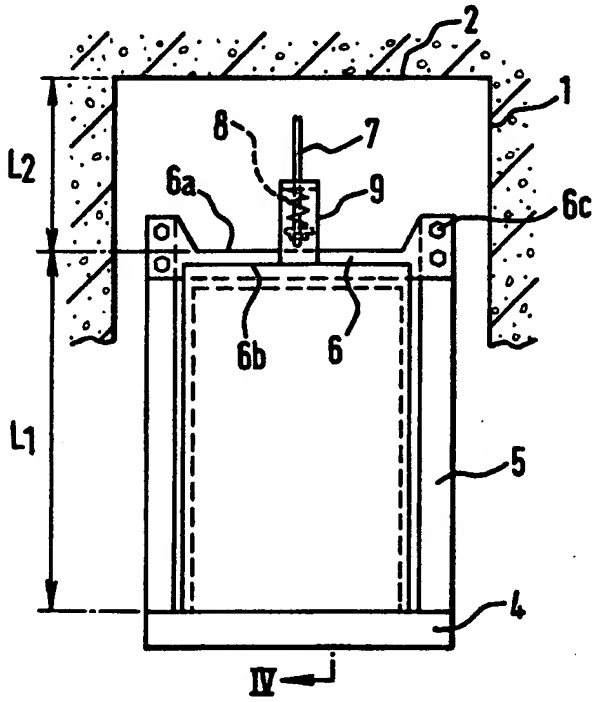

FIG.3.

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The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

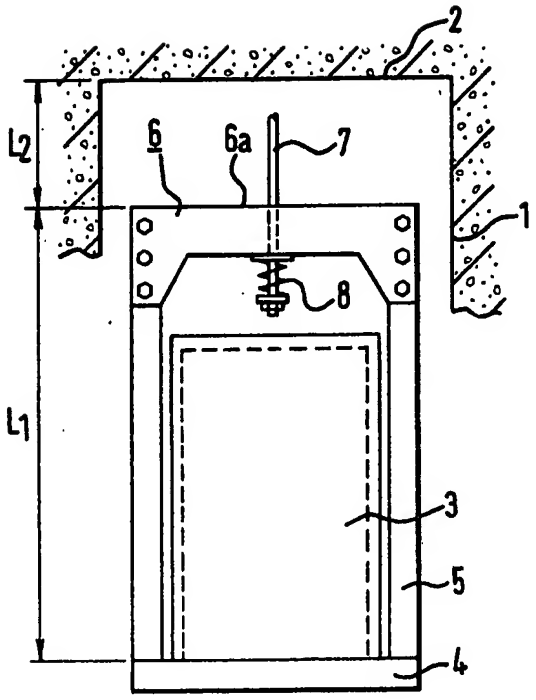

FIG.1. PRIOR ART

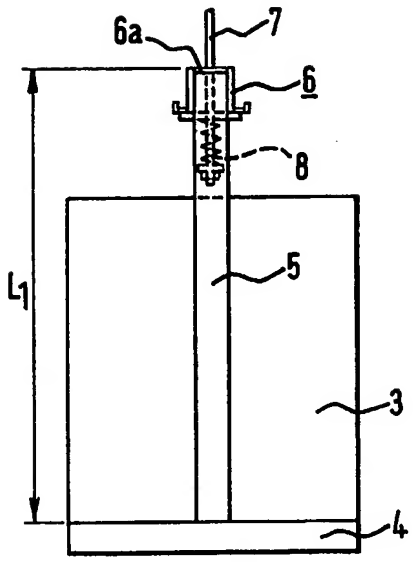

FIG.2. PRIOR ART

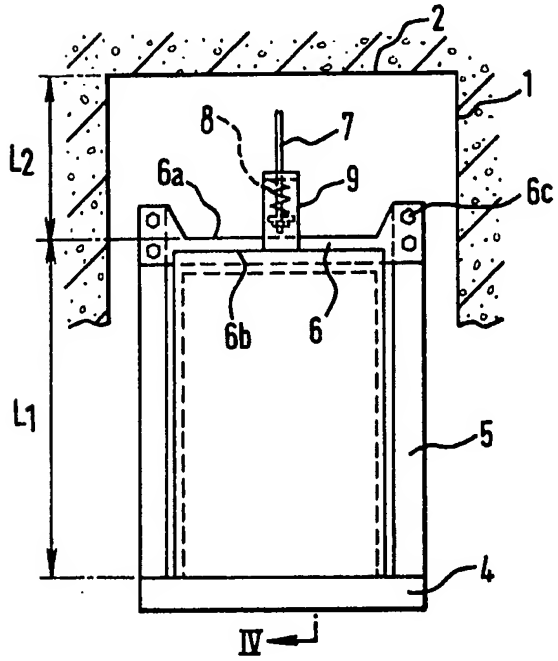

FIG.3.

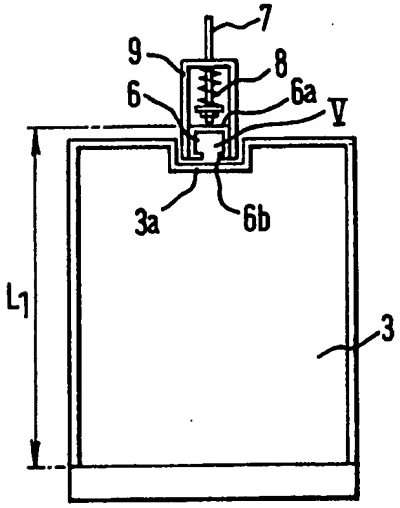

FIG.4.

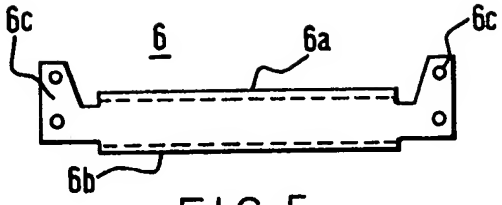

FIG 5

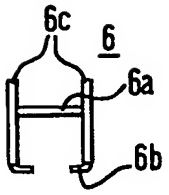

FIG.6.

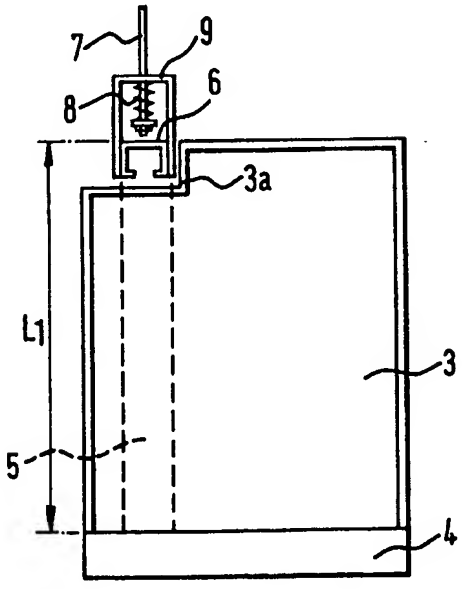

FIG.7.

SPECIFICATION

A car apparatus for an elevator

The present invention relates to an improvement in a car apparatus for an elevator and more particularly to a car apparatus for an elevator which makes it possible to decrease the height of the hoistway.

One example of a hitherto known car apparatuses for an elevator will now be explained with reference to Figs. 1 and 2 of the accompanying drawings. In these figures, reference numeral 1 is wall surfaces constituting the hoistway, 2 is the ceiling of the hoistway, 3 is a car for an elevator adapted to be moved up and down within the hoistway, 4 is the platform of the car 3, 5 is a pair of vertical support frames elongated vertically upwards from the platform 4 and located at midportion of opposite sides of the platform 4 as shown in Fig. 2, 6 is an upper beam having generally a U-shaped cross section and having the appearance of a channel with an elongated web when viewed in a front elevation which rigidly connects the vertical support frames 5 at their upper end portions, and 7 is a hoistway wire rope from one end of which is suspended the upper beam 6 at its mid portion of the width through a buffer means 8. The vertical support frames 5 and the upper beam 6 constitutes the car sling. The car 3 is adapted to be moved up and down along parallel vertical rails (not shown) secured to opposite wall surface 1 of the hoistway by any suitable means.

With such a constitution, the upper horizontal surface 6a of the upper beam 6 is arranged at the same height L_1 as the upper ends of the vertical support frames 5 measured from the upper surface of the platform 4. A distance L_2 is left between the ceiling 2 of the hoistway and the upper surface 6a of the upper beam 6. Although the dimension L_1 is not prescribed by law, the dimension L_2 is prescribed by law to be at least a minimum value to assure a space for maintenance and inspection of the elevator. Therefore, in addition to the space required by the upward and downward movement of the car apparatus for a elevator, a space for maintenance and inspection of the elevator is required by law causing the upper portion of a buiding within which the elevator is to be installed to protrude by this amount. The protrusion is of particular significance in low buildings of three or four stories built in a crowded city since pr trusi n may advers ly bl ck th sun's rays from striking neighbouring buildings. Th protrusion is thus an impediment to the installation of el vators in such low-story buildings.

It is a principal object of the present invention to provide a car apparatus for an elevator which can eliminate the defects in a conventional car apparatus for an elevator as described above.

It is another object of the present invention to provide a car apparatus for an elevator which makes it possible to decrease the height of a hoistway so that the protrusion beyond the roof of a low-story building where the hoistway of the elevator is installed is decreased.

In accordance with the present invention a car apparatus for an elevator comprising a car, a car platform forming the bottom of the car, a pair of vertical support frames each elongating vertically along opposite sides of the car from opposite sides of the car platform, and an upper beam fixedly secured at both ends to the upper end portions of the vertical support frames is provided wherein the upper surfaces of the portions fixedly connecting the upper beam at its both ends with the upper ends portions of the vertical frames are positioned heigher than the upper surface of the upper beam.

In a preferred embodiment of the present invention the upper beam is disposed within a depression formed in the ceiling of the car at the midpoint of the width of the ceiling so that the upper surface of the upper beam is positioned lower than the upper ends of the vertical support frames.

Alternately, the upper beam may be disposed within a depressed portion formed in the ceiling of the car at the rearmost portion of the car.

These and other objects of the present invention will become more readily apparent upon reading the following description and upon reference to the accompanying drawings, in which:

Figures 1 and 2 are schematic front and side elevations, respectively, of a conventional car apparatus for an elevator;

Figures 3 and 4 are schematic front and side elevations, respectively, of one embodiment of a car apparatus for an elevator in accordance with the present invention;

Figures 5 and 6 are front and side elevations, respectively, of the upper beam of the car sling shown in Figs. 3 and 4, on a larger scale; and

Figure 7 is a schematic side elevation similar to Fig. 4 illustrating another embodiment of a car apparatus for an elevator in accordance with the present invention.

It should be noticed that in Figs. 3 to 7 the parts identical or similar to those shown in Figs. 1 and 2 are affixed with the same reference numerals as those used in Figs. 1 and 2.

Reference is now made to Figs. 3 to 6 wherein is shown a first embodiment of the present invention. As will become apparent from a comparis n of these figures with Figs. 1 and 2, this embodiment differs from th conventional elevator car shown in Figs. 1

and 2 merely with respect to the upper beam 6 and r lated portions. That is, in the embodiment shown, the upper beam 6 having generally a U-shaped cross section is secured to th upper end portions of the vertical support frames 5 such that the upper surface 6a of the upper beam 6 is lower than the upper ends of the vertical support frames 5 and the under surfaces 6b of the upper beam 6 is disposed within a depression 3a correspondingly formed in the ceiling of the elevator car 3 midway along its width as shown in Fig. 4. A mounting bracket 9 generally having a similar U-shaped cross section is secured to the upper beam 6 midway along the depth of the bracket 9 and is suspended from the hoisting wire rope 7 through the buffer means 8 which is disposed within the space formed between the lower surface of the bracket 9 and the upper surface 6a of the upper beam 6. As shown in Figs. 5 and 6 the upper beam 6 is formed from a metal plate by bending it appropriately so as to create the upper portion 6a, lower portions 6b, and connecting portions 6c, the connecting portions 6c being adapted to be secured to the upper end portions of the vertical support frames 5. Thus, by making the upper ends of the securing portions 6c of the upper beam 6 which are attached to the upper end portions of the vertical support frames 5 higher than the upper surface 6a of the upper surface 6a of the upper beam 6 measured from the upper surface of the car platform 4, the upper surface 6a of the upper beam 6 is made nearer the upper surface of the car 3 with the regulated dimension L_2 between the ceiling 2 of the hoistway and the upper surface 6a of the upper beam 6 being maintained properly, the dimensions L_1 being made less than the corresponding dimension L_1 in the case of the conventional car 3 shown in Figs. 1 and 2. Thus the height of the hoistway is reduced as a whole.

By making the upper surface 6a of the upper beam 6 lower than the upper ends of the portions 6c to be connected to the upper end portions of the vertical support frames 5, the position of lower surface 6b of the upper beam 6 forces a portruded portion 3a which projects inside the car 3 to be formed in the ceiling of the car 3. In this case, as shown in Fig. 4 the space V formed between the outer surface of the ceiling of the car 3 and the vertical flanges of the upper beam 6 can be advantageously utilized to house therein illuminators, ventilating fans (not shown), and th like, th ceiling b ing appropriately f rm d with openings r the like.

Another embodiment of the present invention is shown in Fig. 7 wherein the car sling 5, 6 is arranged at the rearmost part of the car 3. That is, as shown in the drawing by the dotted lines, the vertical support frames 5 are disposed at the rear part of the car 3 and the upper beam 6 is secured at its both ends to the upper and portions of the vertical support fram s 5. With such a constitution the depressed portion 3a of the car 3 is formed at the upper rear corner-portion of the car 3 between the ceiling and the upper portion of the rear wall of the car 3.

This location of the depressed portion 3a can considerably alleviate any unsightliness of the inside of the ceiling of the car 3 which might be caused by having the depressed portion 3a centrally located.

Although in these embodiments the basic dimension L_2 is the distance between the ceiling 2 of the hoistway and the upper surface 6a of the upper beam 6, when a deflection wheel (not shown) is disposed within the space formed between them, it is needless to say that the height of the space formed between the lower surface of a beam which supports the deflection wheel and the upper surface 6a of the upper beam 6 should be regarded as the basic dimension L_2.

While a few embodiments of the present invention have been described and illustrated herein, it will be understood that modifications may be made without departing from the spirit of the present invention.

CLAIMS

1. An elevator car assembly comprising a car and a car sling which comprises a pair of vertical support members arranged outside said car so as to extend along the opposite side walls thereof and an upper beam disposed horizontally between and fixedly secured at both ends to the upper end portions of said vertical support members, wherein the upper ends of the connecting portions of said vertical support members are positioned higher than the upper surface of said upper beam.

2. A car assembly as claimed in claim 1 wherein said upper beam has both its end portions extended vertically upwards and is fixedly secured at said end portions to said upper end portions of said vertical support members

3. A car assembly as claimed in claim 2 wherein said upper beam has a horizontally disposed portion and end portions provided both its ends each extending upwards higher than the upper surface of said horizontal portion, said end portions being fastened to said upper end portions of said vertical support members.

4. A car assembly as claimed in claim 1, 2 or 3 wherein said upper beam has a generally U-shaped cross section.

5. A car assembly as claimed in claim 4 wherein the op n part of said U-shaped cross section of said upper b am is directed downwards so as to face the upper surface of the ceiling of said car.

6. A car assembly as claimed in claim 4 or

5 wher in the inner space defined by said U-shap d cross section of said upper b am can be used t accomm dat accessories necessary for the operation of said car assembly.

7. A car assembly as claimed in any preceding claim wherein said upper beam is disposed within a depression formed in the ceiling of said car.

8. A car assembly as claimed in claim 7 wherein said depression has a cross section substantially conforming to that of said upper beam and is arranged midway along the width of said car and said vertical support members are correspondingly arranged midway along the width of opposite sides of a platform forming the bottom of the car.

9. A car assembly as claimed in claim 7 wherein said depression is formed in said ceiling at its rear portion so that the botttom surface of said depression extends horizontally until its rearmost side meets the rear wall of said car where the upper end thereof terminates, and said vertical support members are correspondingly arranged so as to extend from the rear portions of opposite sides of a platform forming the bottom of the car.

10. A car assembly as claimed in any preceding claim wherein provided at substantially the mid-portion of said upper beam is a connecting means to connect one end of a wire hoist rope to suspended said car assembly through said upper beam, said rope being connected to said connecting means through a buffer means.

11. A car assembly as claimed in claim 10 wherein said connecting means is secured to said upper beam so that there is left a space therebetween, said buffer means being received within said space.

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